

AWS
re:Invent

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Hands-on: Building a multi-region active-active solution

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Agenda

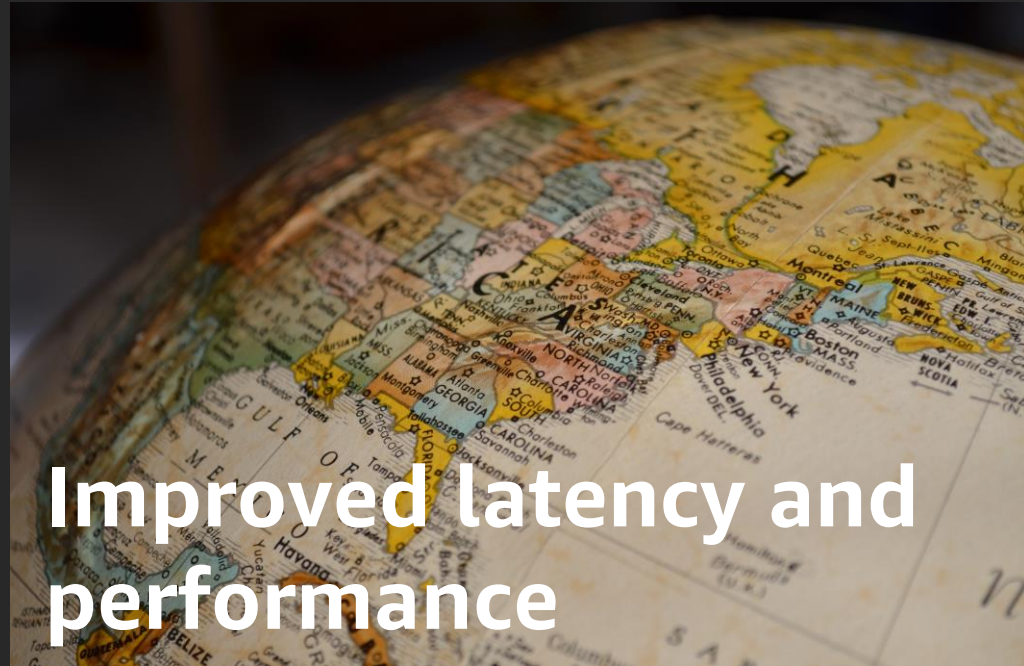
Hands-on workshop overview

AWS multi-region active-active services

Get started!

Workshop overview

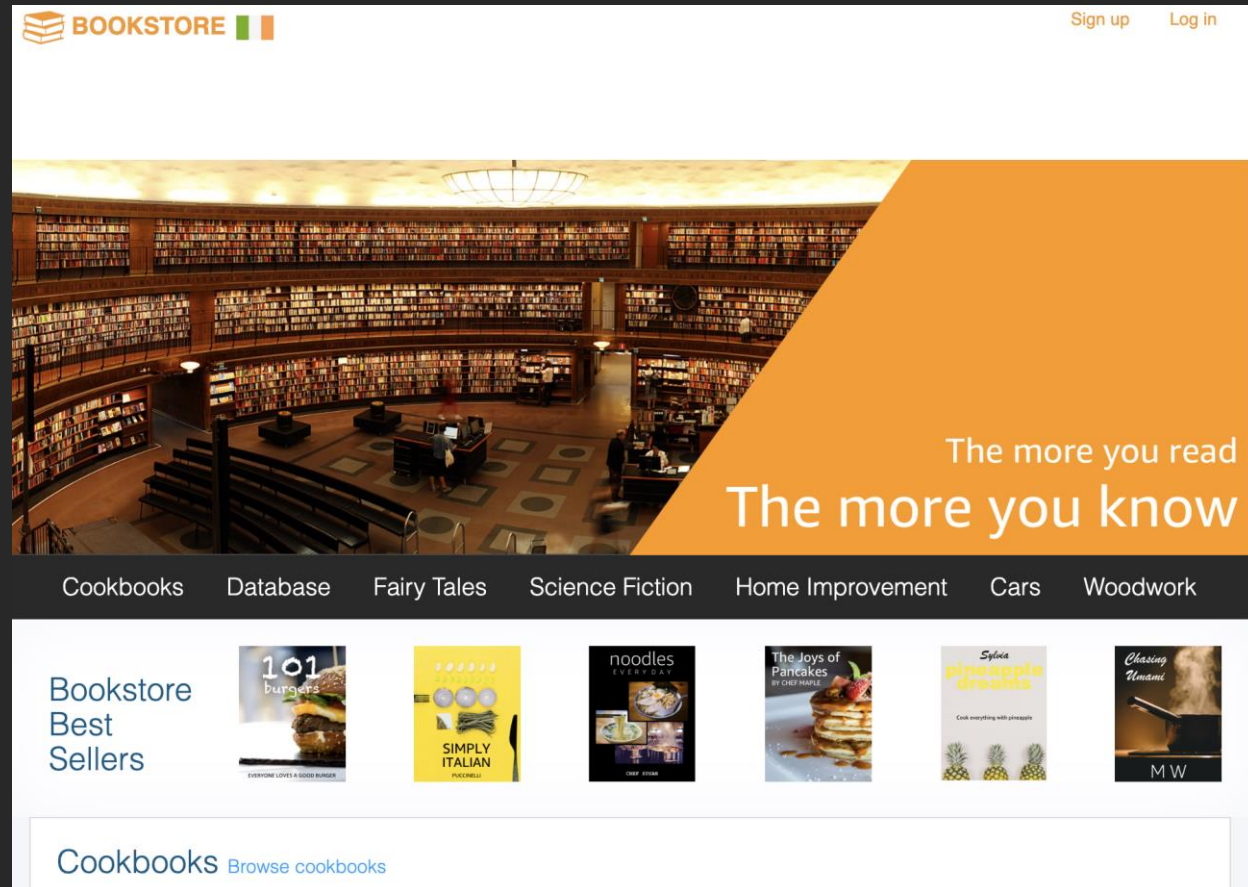
Why are we going multi-region?



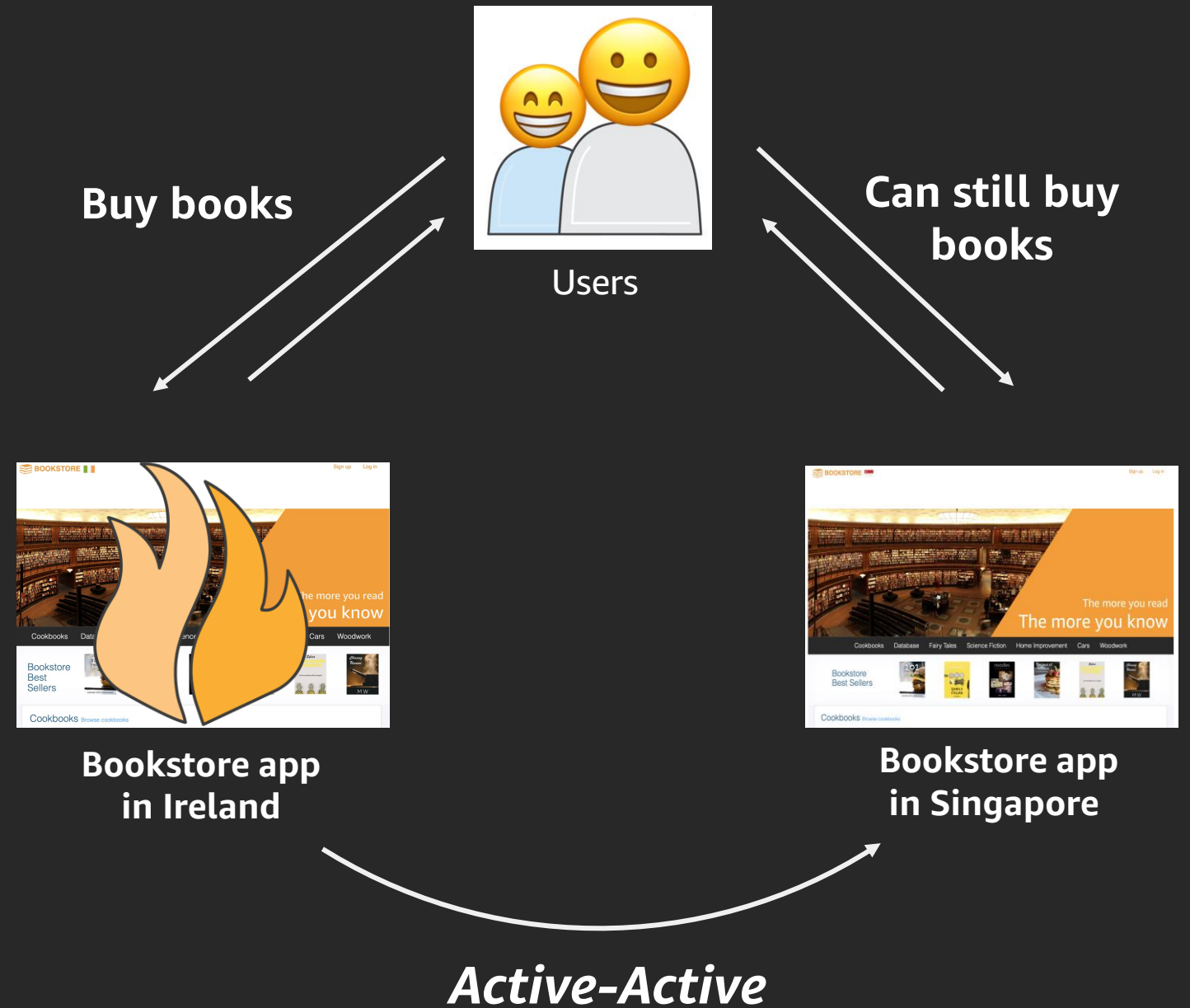
Multi-region modern architecture

- Multi-region active-active (active-passive) architecture
- Modern web application using AWS Amplify and ReactJS
- Modern application architecture using serverless and container
- Polyglot persistence database architecture with Amazon DynamoDB and Amazon Aurora MySQL

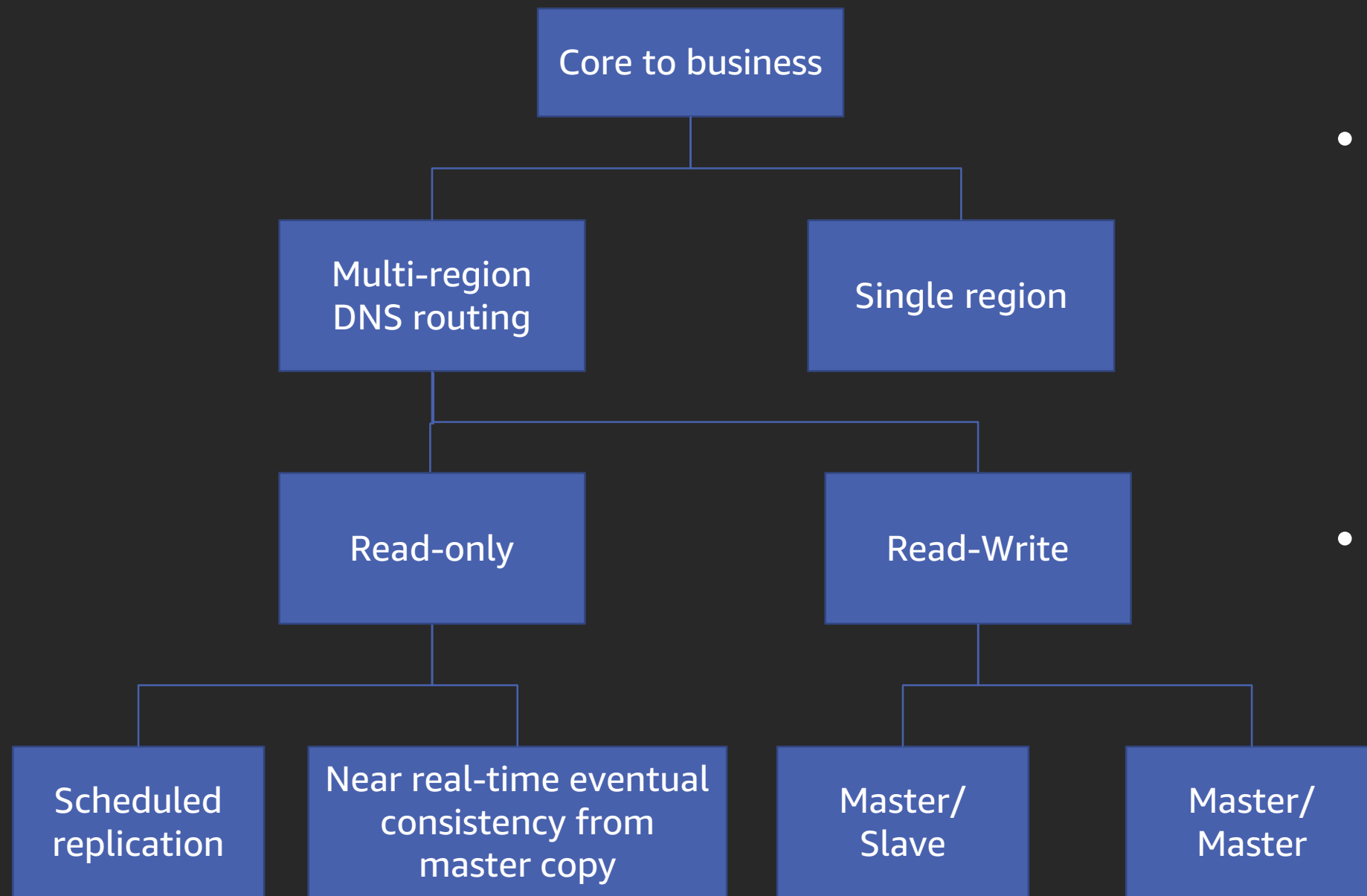
What you build today



[arc309.multi-region.xyz]



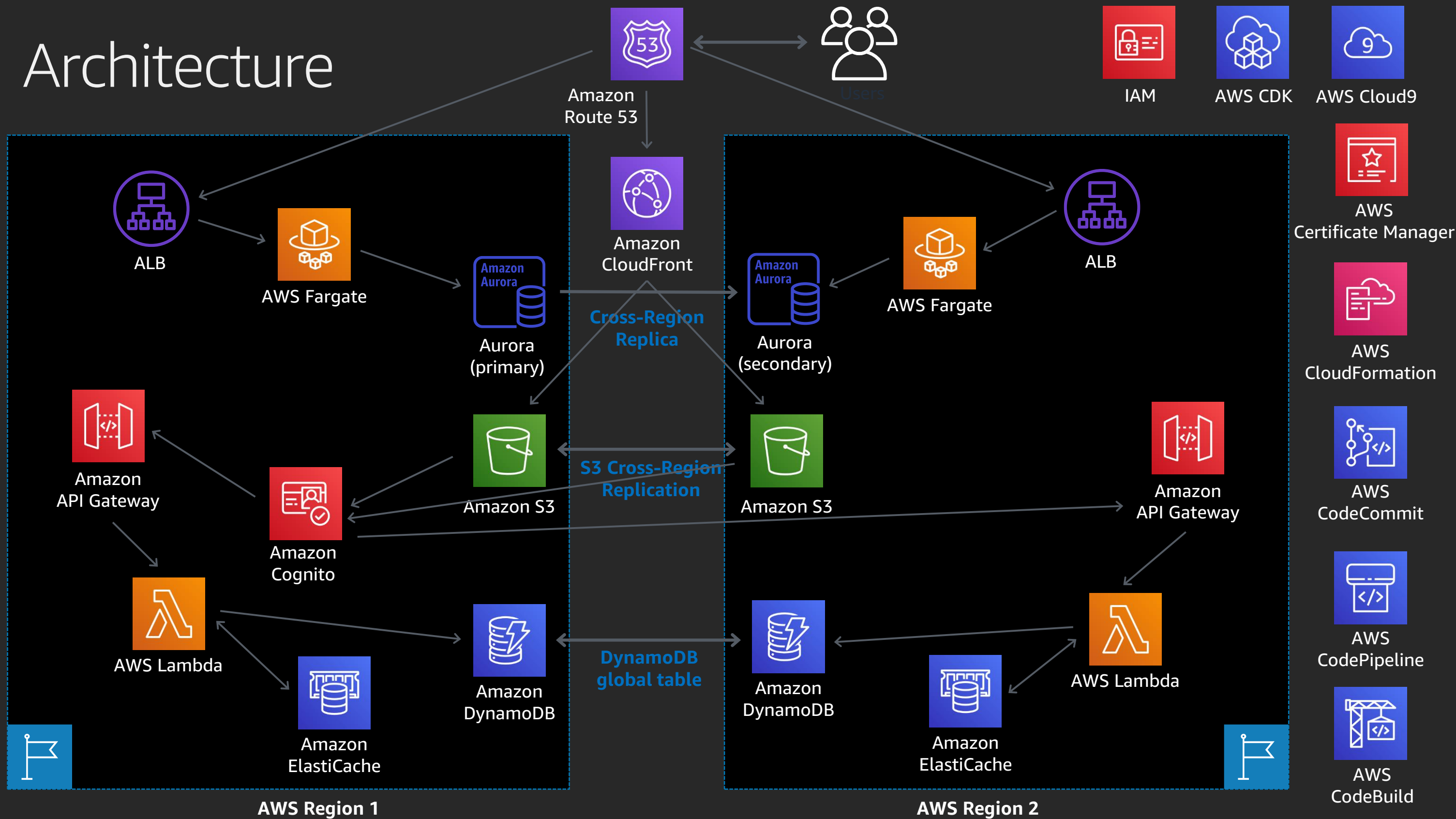
Does it need to be multi-region?



- Can we do business without this service? How much redundancy do we need?

- How does this service access persistent storage?

Architecture



Multi-region active-active services

Route 53 routing and health check

Route 53 routing policy determines how Route 53 responds to queries

Route 53 health check monitors the health of your web application

Configure DNS failover that Route 53 will route your traffic from an unhealthy resource to a healthy resource

Route 53 active-active DNS failover configuration actively returns more than one resource

On failure, Route 53 fails back to the healthy region per routing policy



Amazon CloudFront with S3 origins group

S3 Cross-Region Replication replicates contents geographically

CloudFront distribution supports multi-region S3 origins failover

If CloudFront detects primary origin is unavailable, content is served from secondary origin

Improve availability and performance for your globally distributed users with AWS Global Accelerator



API Gateway endpoints and custom domain name

API Gateway regional endpoint access directly to the region-specific APIs to reduce request latency when API requests originate from the same region as your REST API

Regional API can create a custom domain name for specific region and different region

Create wildcard custom domain names for API Gateway regional APIs



Aurora multi-region Read Replica

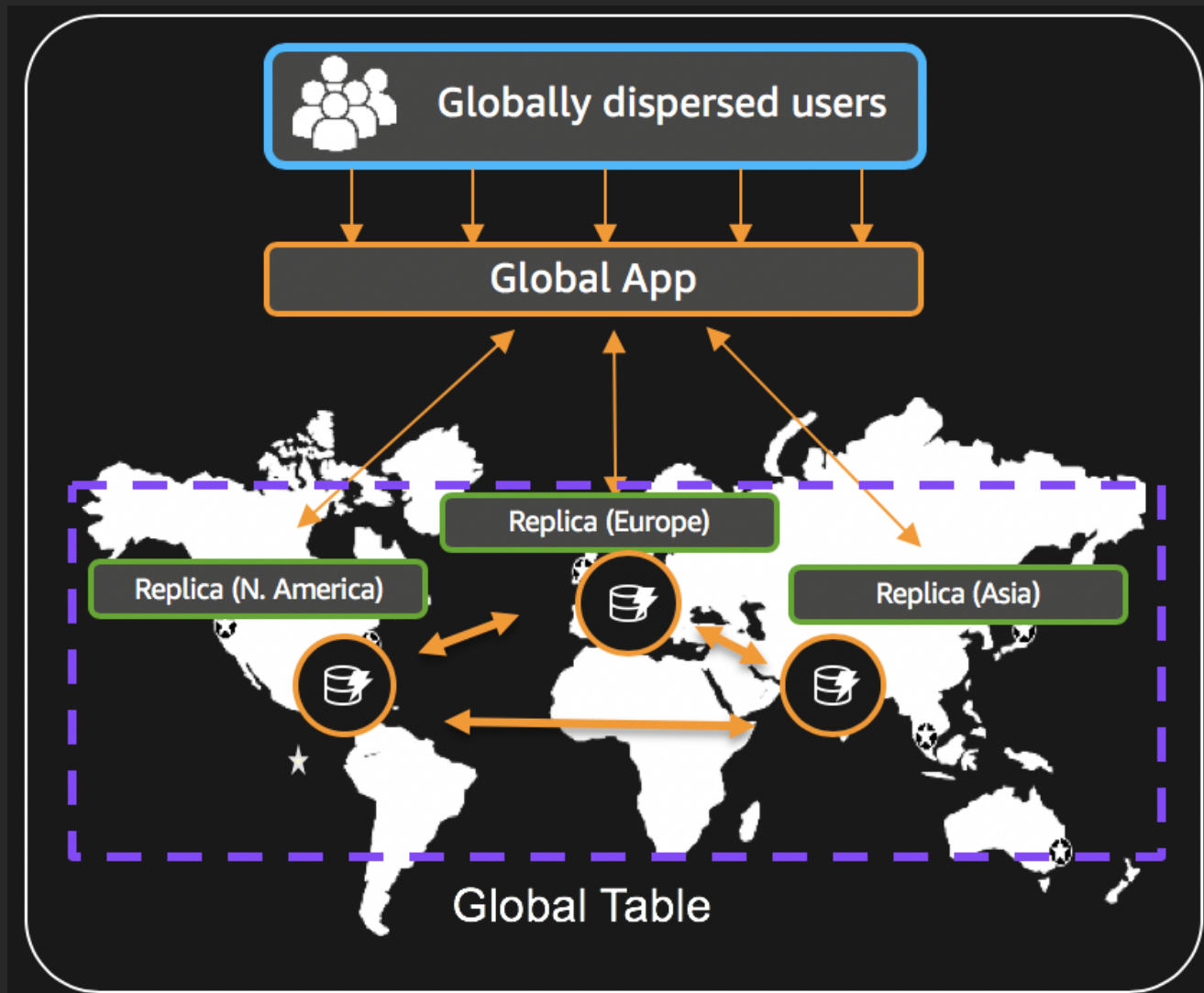
Bring data close to your customers' applications in different regions

Relieve pressure on your master node for supporting reads and writes

Promote a Read Replica to a master for faster recovery in the event of disaster



DynamoDB global tables



Build high-performance, globally distributed applications

Low latency reads & writes to locally available tables

Disaster-proof with multi-region redundancy

Easy to set up and no application rewrites required

Use a *Last Writer Wins* reconsolidation for eventual consistency

Other AWS services

AWS Fargate—Run containers without having to manage servers or clusters

Amazon Cognito—Federation and authentication

AWS Lambda—Serverless compute service runs your code in response to events

Amazon ElastiCache—High-throughput and low-latency in-memory data stores

AWS Certificate Manager—Manage public and private (SSL/TLS) certificates

AWS Identity and Access Management (IAM)—AWS resource permissions

AWS Cloud9—Cloud-based integrated development environment (IDE)

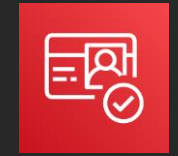
AWS Cloud Development Kit—Define cloud resources in programming language

AWS CloudFormation—Configuration management

AWS Code services—CodeCommit (Git repositories), CodeBuild (build and test code), CodePipeline (automate continuous delivery pipeline)



AWS Fargate



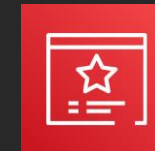
Amazon Cognito



AWS Lambda



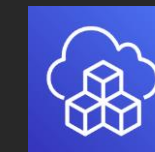
Amazon ElastiCache



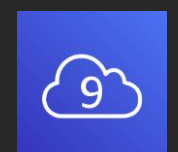
AWS Certificate Manager



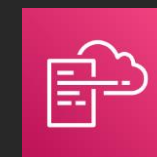
IAM



AWS CDK



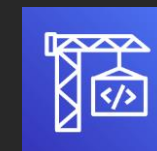
AWS Cloud9



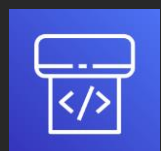
AWS CloudFormation



AWS CodeCommit



AWS CodeBuild



AWS CodePipeline

Summary

It's easy to forget...



Code

We still want to access our code in the event of a regional outage. We may need to make updates or deploy elsewhere.

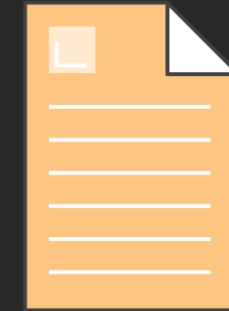
CodeCommit supports backing up or replicating to another region.



Data

Our data needs to be available in a second region so that our service can continue to operate.

DynamoDB global tables, Aurora cross-region Read Replica, and S3 Cross-Region Replication replicates data automatically across your choice of AWS Regions.



Templates

We might need to quickly deploy or make updates to our app while the service is failed over.

Enable S3 Cross-Region Replication stores CloudFormation templates

Get started!

Workshop requirements

Administrator access to a working AWS account

We assume only one student is using a given AWS account at a time

Laptop's security policy allows any third-party cookies (required by AWS Cloud9)

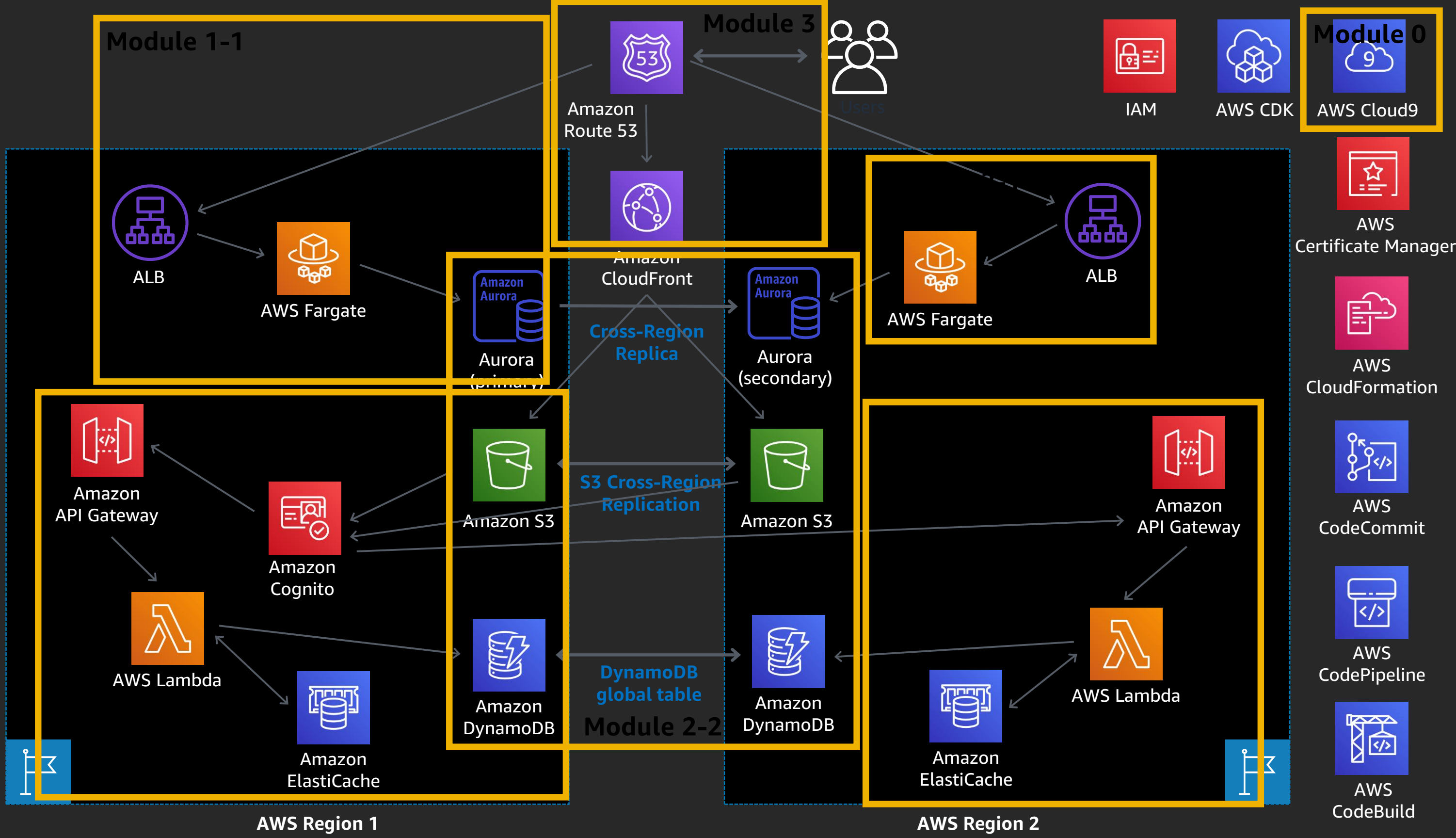
AWS provide \$25 credits to each participant for resources in workshop

Each workshop participant will configure components themselves—this lab is hands-on

Participants will have a choice of using the AWS Command Line Interface (AWS CLI), or using the AWS Management Console

Please use Chrome or Firefox browsers

<https://bit.ly/ARC309>



Your tasks

1. Build a single-region service (30 min)—Build an API and UI layer
2. Stand up a second AWS Region (30 min)
3. Configure DNS health checks and active-active routing (30 min)
4. Test failover (20 min)

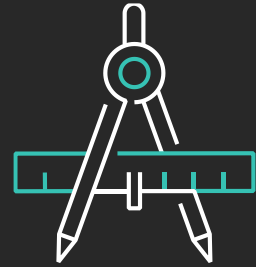
Provided video will help “catch up” to the next section if you get stuck

Work together with your table/team and help each other out

Jay, Eng-Hwa, support teams are all here to help—ask us questions

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Thank you!

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